Characterizing the Core Collection for Resistance to Pythium and Rhizoctonia Root Rots.

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Introduction.

The core collection of the cultivated *Phaseolus vulgaris* L developed at CIAT consists of a smaller and manageable number of accessions selected on the basis of geographical and agro-ecological origin, seed proteins and genetic structure, and is meant to reflect the diversity of reserve collection in the gene banks.
Root rots are a major limiting factor in bean production in certain regions of Africa and Latin America (Abawi and Pastor-Corrales, 1991) characterized by diminishing land sizes, intensive agricultural production and declining soil fertility. Pythium, Rhizoctonia and Fusarium root rots, caused by *Pythium* spp, *Rhizoctonia solani*, and *Fusarium solani* f. sp. *phaseoli* are the main root rot diseases in eastern and central Africa, often occurring in association (CIAT, 1992, Rusuku et. al., 1997). The objective of the present study was to characterize the core collection for resistance to Pythium and Rhizoctonia root rots, and to identify sources of resistance that may be used for varietal improvement.

Materials and Methods.

Five hundred and fifty genotypes representing about third of the core collection were evaluated under greenhouse conditions (Abawi and Pastor-Corrales, 1991). Twelve seeds per genotype were planted in wooden trays containing soil artificially infested with the inocula of *Pythium* spp and *Rhizoctonia solani*. Soil moisture condition was manipulated to favour root rot development. Two to three weeks after inoculation, genotypes were evaluated for both Pythium and Rhizoctonia root rots using a CIAT scale of 1 to 9 where 1 = no visible symptoms; and 9 = approximately 75 % or more of the hypocotyl and root tissues have lesions; the root system suffers advanced stages of decay and considerable reduction and plants may be wilted or dead (Schoonhoven and Pastor-Corrales, 1987).

Results and Discussion.

Eight and 47 genotypes gave resistant (scale 1-3) and intermediate (3.1-6.9) reactions respectively, while most (495 genotypes) were susceptible to both Pythium and Rhizoctonia root rots. Very few genotypes combined good level of resistance to both diseases. Examples are G 934, G 2681, G 2772, G 2910 and G 15971. Of the 55 genotypes with resistant or intermediate reactions, two-thirds were of small or medium seed types, 47 were of growth habit types 3 and 4 (Figure 1), and 40 originate from Mexico (Figure 2). Considering that only a third of the core collection has so far been characterized, the tendency observed is still regarded tentative. The core collection characterization is continuing.

FIGURE 1. GROWTH HABIT TYPES OF 55 CORE COLLECTION GENOTYPES WITH RESISTANT OR INTERMEDIATE REACTION TO PYTHIUM AND RHIZOCTONIA ROOT ROTS

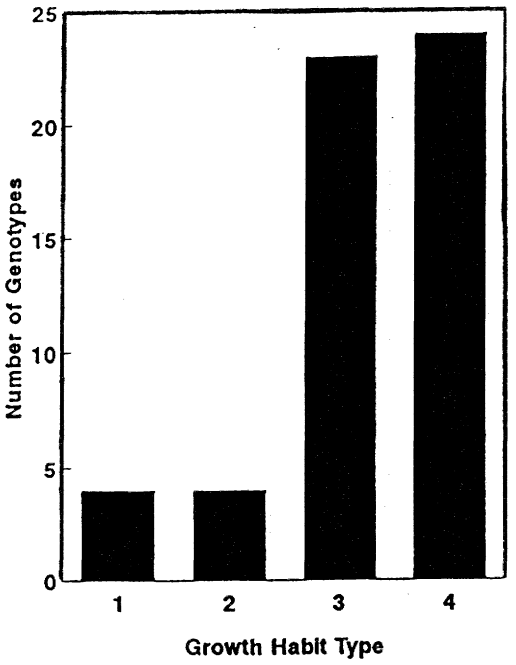
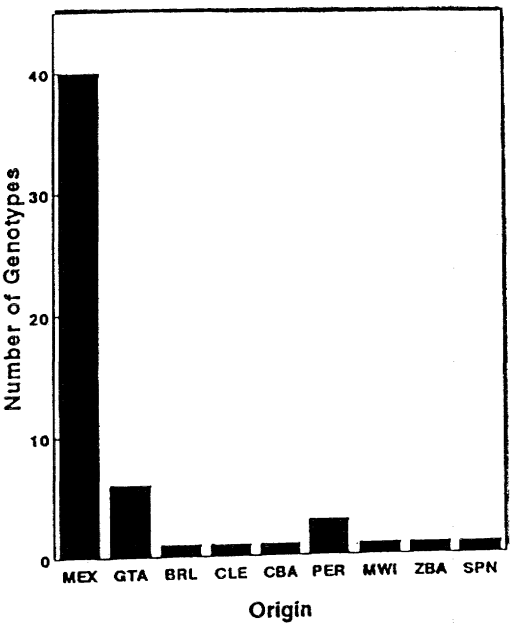


FIGURE 2. ORIGIN OF 55 CORE COLLECTION GENOTYPES WITH RESISTANT OR INTERMEDIATE REACTION TO PYTHIUM AND RHIZOCTONIA ROOT ROTS



MEX=MEXICO, GTA=GUATEMALA, BR=BRAZIL
CLE=CHILE, CBA=COLOMBIA, MWI=MALAWI,
ZBA=ZAMBIA, SPN=SPAIN

Literature cited.

Abawi, G. S., and Pastor-Corrales, M. A. 1990. Root Rots of Beans in Latin America and Africa: Diagnosis, Research Methodologies, and Management Strategies. Centro Internacional de Agricultura Tropical, Cali, Colombia.

Centro Internacional de Agricultura Tropical. 1992. Root rots. Pages 119-131 in: Annual Report, Bean Program. CIAT, Cali, Colombia. (Typescript).

van Schoonhoven, A., and Pastor-Corrales, M. A. 1987. Standard System for the Evaluation of Bean Germplasm. Centro Internacional de Agricultura Tropical, Cali, Colombia.

Rusuku, G., Buruchara, R. A., Gatabazi, M., and Pastor-Corrales, M. A. 1997. Occurrence and distribution in Rwanda of soilborne fungi pathogenic to the common bean. Plant Dis. (accepted for publication)